L11: Entry 7 of 9 File: USPT Oct 26, 1999

DOCUMENT-IDENTIFIER: US 5971325 A
TITLE: Compensation for rotorcraft pitch axis control saturation

Brief Summary Text (5):
A condition observed during remote control of a small unmanned aerial vehicle (UAV) of the rotorcraft type having a low power-to-weight ratio and coaxial rotors, involves the difficulty in maintaining stable manual longitudinal (pitch) control, particularly in response to rapid shifts in pitch attitude resulting from wind gusts and the like. For example, when the rotorcraft pitches nose up as the result of an input such as a wind gust, the operator will attempt to compensate with an appropriate nose down pitch control response. However, depending upon the rate and magnitude of the corrective action required, the pitch servo control may be driven to saturation, thus limiting the requisite response. In an extreme instance, failure to provide the requisite pitch control for the rotorcraft may result in loss of its control. In an effort to avoid that consequence, the operator may attempt to manually reduce the collective control when the pitch control saturates. However, that action as well requires careful monitoring of the pitch control and rapid adjustment of the collective control, which may severely test the dexterity of the operator flying the UAV rotorcraft. Indeed, it may not be possible to manually respond with sufficient speed and accuracy to avoid loss of control of the rotorcraft.

Brief Summary Text (7):
An object of the present invention is to provide a control system for a rotorcraft flight vehicle which automatically compensates for vehicle pitch control saturation. A further object of the invention is to provide a control system for a relatively small rotorcraft flight vehicle which facilitates remote or automatic control of the vehicle under adverse wind conditions.